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AQUATIC HABITAT MANAGEMENT PLAN

Mahogany Creek Habitat Area

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AQUATIC HABITAT MANAGEMENT PLAN

Mahogany Creek Habitat Area

Prepared by:

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Winnemucca District

With Assistance By and in Cooperation With:

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Nevada Department of Fish & Game

Don King

Bureau of Sport Fisheries and Wildlife

Approved by:	Bureau of Land Management	JUN 25 1971 Date	District Manager
Concurred by:	Nevada Department of Fish and Game	June 9, 1971 Date	Ray P. Corlett Regional Supervisor

INTRODUCTION

Mahogany Creek has been given first priority for aquatic habitat management plans in the District because it is the spawning stream for the last known genetically pure strain of Lahontan Cutthroat trout (Salmo clarki henshawi). This trout matures and lives in Summit Lake, into which Mahogany Creek drains, and spawns in the creek each spring.

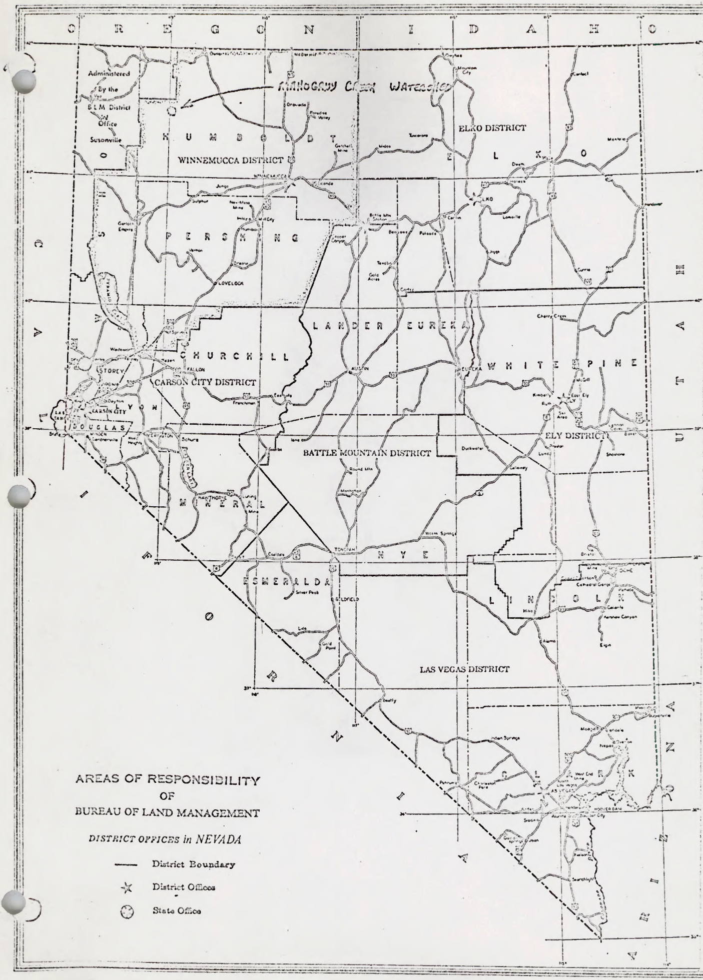
Mahogany Creek is located in the western portion of Humboldt County approximately 78 miles northwest of Winnemucca. The total length of the creek and it's tributaries is approximately twelve (12) miles although about five (5) miles of this is not good fish habitat because of the small stream flow.

Summit Lake has an extremely productive potential and if the natural reproductive success of spawners increased through improvement of Mahogany Creek for spawning purposes, the potentail can be approached although supplemental hatchery planting may still be necessary. It is estimated by the Bureau of Sport Fisheries and Wildlife that only 1800 young of the year are now produced by the creek while 35,000 are planted in the Lake from BSF&W hatcheries. The BSF&W estimates that the creek could produce between 9,600 and 84,000 fingerlings per year if the spawning potential of the creek was improved.

Summit Lake's trout populations are not at it's carrying capacity, however, it is hoped to bring the population up to not only insure a healthy natural population of this rare and

endangered fish but to provide a viable sport fishery on the lake. This fishery could be made available on a permit basis from the Summit Lake Indians whose reservation surrounds the lake. The lake will also provide the source for re-establishment of the species to Pyramid & Walker Lakes, its original habitat.

This habitat plan has been prepared by the Bureau of Land Management with the cooperation and assistance of the Nevada Department of Fish and Game, and the Bureau of Sport Fisheries and Wildlife.



AREAS OF RESPONSIBILITY
OF
BUREAU OF LAND MANAGEMENT

DISTRICT OFFICES in NEVADA

—— District Boundary

☆ District Offices

⊙ State Office

NSO-114
(Nov. 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NEVADA STATE OFFICE

INFORMATION FOR MINING CLAIMANTS

The County Recorder has been requested to include this information sheet with the return of your recorded location notice. Its purpose is to inform you concerning certain restrictions in the use of mining claims, to ask your cooperation in preventing the misuse of public lands and minerals, and to offer the assistance of the Bureau of Land Management (BLM) employees in Nevada to users of public lands, such as yourself.

The management of the surface resources and of the non-locatable minerals on the public domain is one of the responsibilities of the BLM. Certain types of minerals are *not locatable* under the mining laws, and may only be leased or purchased through the BLM. In the administration of public lands in Nevada we find many instances where individuals locate a mining claim for purposes other than mining and, of course, such purposes are not authorized under the mining laws. Three of the most common violations are:

1. The use of mining claims for purposes not related to mining, such as cafes, bars, service stations, homesites, recreational cabin sites, etc.
2. The location and removal of the so-called "common variety" mineral materials from a mining claim. Examples are: sand and gravel, many kinds of decorative or ornametal stone, rock for roofing granules, rubble, fill dirt and top soil, cinder, pumice, and brick clay. These and similar materials have not, since July 23, 1955, been open to location under the mining law and, consequently, may not be removed from claims located after that date or from older claims that did not show a profitable market for any one of the materials prior to that date. (Production before that date is usually considered proof of marketability).
3. The location and development of mining claims on land that is withdrawn from mining location. Such withdrawals are made for many public and governmental purposes, such as reclamation, recreation, small tracts, military and defense uses. A check of the official public land records in BLM's Reno office will disclose whether the land is open to location under the mining laws. These records are available to the public between 10:00 A.M. and 3:00 P.M. Monday through Friday, except holidays.

Such unauthorized use constitutes a trespass against the United States and the BLM will assess occupancy or mineral trespass damages as required by law. This is so, even though the violation may have occurred in good faith in that the claimant did not know his operation or use was unlawful. It is for these reasons that we wish to caution all owners of mining claims to avoid potential unlawful use or occupancy of public lands.

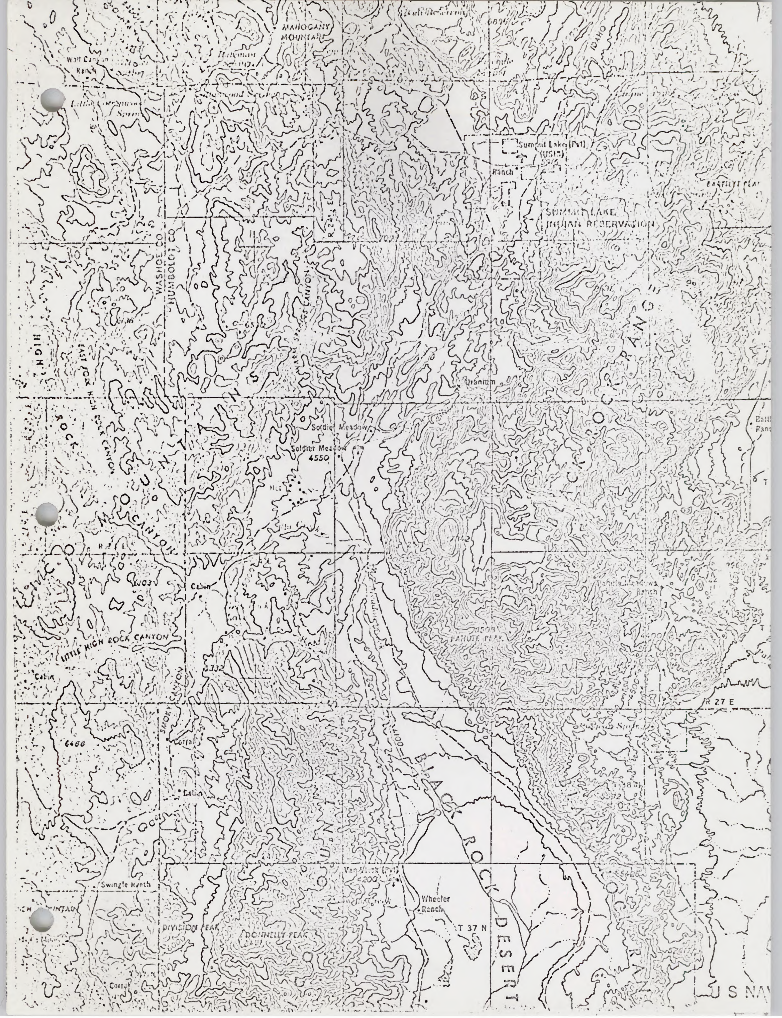
If you are interested in obtaining land for a homesite, a business site, or some other non-mining use, you should attempt to lease or acquire this land under a more appropriate law rather than through any misuse of the mining laws. Inquiries concerning the possibilities of acquiring a specific parcel of land for a particular use, and the proper manner to proceed, should be directed to the Bureau of Land Management, Post Office Box No. 1551, Reno, Nevada.

If you wish to remove any one of the "common variety" mineral materials, you should file an application to purchase this material from the BLM district office that administers the area. Addresses of these offices are listed hereafter together with a map showing their location and the areas they administer.

Although most of this leaflet refers to restrictions on the use of mining claims, the BLM is not attempting to discourage legitimate mineral prospecting and development. Most of the public lands are still open to mining location, and most metalliferous minerals and such non-metallic minerals as gypsum, diatomite, and chemical, metallurgical and cement grade limestone, to name but a few, remain subject to location, development and patenting under the mining laws. Mining claims may be occupied and used in any manner reasonably necessary and incidental to a bona fide mining operation.

If you have any questions about the use of the public lands and their mineral resources, please feel free to contact any of the BLM offices. The Reno office (P.O. Box 1551, 300 Booth Street, Reno, Nevada) can best answer questions of a general nature and inquiries concerning the status of specific lands.

State Office, P. O. Box 1551, 300 Booth Street, Reno 89505
Elko District Office, 2002 Idaho Street, P. O. Box 592, Elko 89801
Winnemucca District Office, East Highway 40, P.O. 71, Winnemucca 89445
Carson City District Office, 807 N. Plaza Street, Carson City 89701
Ely District Office, 777 Aultman Street, P.O. Box 1289, Ely 89301
Las Vegas District Office, 1859 North Decatur Blvd. Las Vegas 89107
Battle Mtn. District Office, 2nd and Scott Streets, P.O. Box 194, Battle Mountain 89820


MAHOGANY MOUNTAIN
Wall Canyon Ranch
6890
Summit Lake (Pvt) (USIS)
Ranch
SUMMIT LAKE INDIAN RESERVATION
WASHOE CO
HUMBOLDT CO
HIGH ROCK
EAST FORK HIGH ROCK CANYON
Uranium
Soldier Meadow
Soldier Meadow 4550
CANYON
Cabin
LITTLE HIGH ROCK CANYON
PAHUTE PEAK
Pahute Meadows Ranch
R 27 E
SHORT CANYON
6488
Corral
Cabin
BLACK ROCK DESERT
Swingle Ranch
DIVISION PEAK
DONNELLY PEAK
Wheeler Ranch
T 37 N
U S NAV

GENERAL INFORMATION

Maps

Two (2) maps immediately preceding this page show the location of Mahogany Creek and its watershed. A more detailed map of the area with overlays is located under the map section towards the back of the report.

Location and Physical Features

Mahogany Creek Watershed, containing approximately 8,320 acres, drains into Summit Lake to the west. The drainage system consists of Mahogany Creek and its two (2) tributaries or branches, Pole Creek and Summer Camp Creek.

From the headwaters to the lake the creek has a vertical drop of 1,764 feet in approximately nine (9) miles. Over 1,500 feet of this drop occurs in the first six (6) miles from the headwaters to approximately the Summit Lake Indian Reservation boundary. The steepest portion of the stream is located in the two (2) mile stretch upstream from the Reservation fence where the creek tumbles into a gorge over rocks and small waterfalls.

Mahogany Creek is a small stream never more than six (6) feet wide and varying in flow from a trickle at the extreme headwaters to an estimated two (2) feet per second (August 1969) near the reservation fence. Volume of the creek at the mouth of the gorge on May 14, 1940, was estimated at twelve (12) to sixteen (16) cubic feet per second.

Land Ownership and Administration

Approximately six (6) miles of Mahogany Creek and its small tributaries are located on public land, about four (4) miles are on the Summit Lake Indian Reservation and approximately two (2) miles are on private land owned by Mr. Gordon Van Vleck (See map).

Land Classification

12,316 acres of public lands covering the entire drainage of Mahogany Creek were segregated from all forms of appropriation including the General Mining Laws on November 16, 1967. This land was classified in Classification N-1279 under the Act of September 19, 1964 (43 USC 144-18) subject to valid existing rights. The land is described as follows:

T. 41 N., R. 26 E., MDM
Sections 1, 2, 3, 4, 11 & 12

T. 42 N., R. 26 E., MDM
Sections 14, 15, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35 & 36.

T. 42 N., R. 27 E., MDM
Sections 19, 29, 30, 31 & 32

T. 41 N., R. 27 E., MDM
Section 6,

472 unpatented lode mining claims are located on the lands. The validity of these claims is being challenged by the BLM, however, final decision in the cases has not been completed.

ANALYSIS

In August of 1969 a joint BLM-Nevada Fish & Game study was made of the creek to determine its condition and chemical and physical features. A previous cursory field study of the creek was made by the Bureau of Sport Fisheries and Wildlife in 1967. This study pointed out some of the problems with the habitat of the creek and the need for further, more detailed study and planning. This led to the 1969 study and this habitat plan.

The 1969 study was conducted by Jerry C. Wickstrom of the Winnemucca District BLM and Mike Hess of the Nevada Department of Fish & Game using a modified Harrington-Dunham study method (U. S. Forest Service Research Paper INT-41). See appendix (Nevada Fish & Game report and notes from the August 1969 study).

In addition to the study of the creek, a limited survey of the watershed was made by Jerry Wickstrom, Herman Kast and Warren Schwabel to classify it into one of the six classes of watershed erosion recognized by the BLM Manual (See appendix). This limited watershed evaluation was supplemented by a watershed survey of the area by Ed Dimick, BLM Watershed Specialist, on May 14, 1970.

The results of the August 1969 study are well presented in the Nevada Department of Fish & Game job progress report (See appendix).

Mahogany Creek Habitat Study Analysis

Chemical and other data were taken at three (3) points on the drainage; Point A located approximately 200 feet upstream from the Reservation fence, Point B on Mahogany Creek approximately 500 feet upstream from the junction with Summer Camp Creek and Point C on Summer Camp Creek approximately 200 feet upstream from its junction with Mahogany Creek (See map).

In addition, 75 transects were taken at 200 feet intervals on Mahogany Creek between the Reservation fence and Point D. Twenty-five (25) transects were taken on Summer Camp Creek (See map for location). These transects recorded; streamside vegetation, width of the stream, depth at both sides and the middle, bottom type, bank stability, water type - pool or riffle, and pool quality. A running commentary was also taken regarding stream characteristics between transect points (See appendix for note cards and comments).

Findings

1. Chemistry - No habitat problems exist from a chemical Standpoint.
    a. Dissolved oxygen levels are optimum for trout.
    b. pH levels are within the range optimum for healthy trout production and survival.
2. Turbidity - Turbidity varied from 0.0 Jackson turbidity units in Mahogany Creek near the Reservation fence and at point B above the actively eroding area, to 50 immediately below the eroding falls (See photo 17).

Summer Camp Creek turbidity was 20-30 Jackson units above the eroding falls.

The turbidity that was found in Mahogany Creek was directly related to the actively eroding falls. The turbidity in Summer Camp Creek is ascribed to the 70% occurrence of livestock trampling along its course.

It must be remembered that the study was made at a time when stream flow is near the low for the year. Turbidity is sure to be higher in the spring of the year during runoff because of the high occurrence of unstable banks (41.4% on Mahogany Creek and 28.1% on Summer Camp). Turbidity observations taken in May of 1970 at the same locations found that Summer Camp Creek was only slightly turbid above the actively eroding headcut (bottom visible). Turbidity increased below the eroding falls so that the bottom was not visible through six (6) inches of water.

Mahogany Creek above the actively eroding falls was more turbid than upper Summer Camp Creek but the bottom was visible through four (4) inches of water. Below the falls the turbidity of Mahogany Creek was such that the bottom was not visible through six (6) inches of water. Lower Mahogany Creek below the gorge was milky in color, but the bottom was visible through six (6) inches of water.

On May 19, 1970, measurements of turbidity were again taken at the Stations A, B & C with the Hatch DR

Colorimeter which measured Jackson turbidity units as follows:

Station A	120 Units
Station B	130 Units Above Eroding Falls
	130 Units Below Eroding Falls
Station C	120 Units Above Eroding Falls
	130 Units Below Eroding Falls

Sources of silt on the drainage include cattle trampled areas, undercut and unstable banks, actively eroding heads on both creeks, and the road from Stanley Camp to Summer Camp where it crosses Mahogany Creek (See Photos #13 & 14 and map)

3. Temperatures

Water temperature ranges for the waters of both Mahogany Creek and Summer Camp Creek were within the optimum range for trout at the sample Points A, B & C. Near the end of the transect system on Mahogany Creek, however, (Transect 72 & 75) the temperature of the water was registered at 68^{o} which is approaching the limit for trout. This rise in temperature is probably caused by a combination of low volume, shallowness and lack of stream bank cover in portions of upper Mahogany Creek (See Photos #12 & 16).

4. Stream Banks

On Mahogany Creek as a whole, approximately 41% of the banks were found unstable while 28% were unstable on Summer Camp Creek. Cattle trampling therefore did not

cause bank instability in every case. In some cases enough vegetation was firmly rooted in spite of cattle punctures to insure stability for the present. In others, the banks were very rocky in the vicinity of cattle trampling. Many of the unstable and undercut banks of these streams, however, were probably caused initially by cattle trampling in years past (See Photos #11-14).

5. Stream Bottoms

More than 86% of the bottom of Mahogany Creek was composed of rubble or gravel while 96% of the bottom of Summer Camp Creek was composed of these two classes. Only 12% of Mahogany Creek was rated sand-silt. In general, the stream bottom of the portions surveyed showed good potentials for spawning within the limits of the small stream size and flow.

6. Obstructions

Obstructions on the stream system are of four types: (1) one (1) natural rock waterfall four(4) to five (5) feet high in the gorge on lower Mahogany Creek (photo #21) and one (1) eight (8) foot waterfall on Summer Camp Creek; (2) waterfalls four (4) feet high caused by erosion of the stream channels at points 200 feet upstream on Summer Camp Creek and 500 feet upstream on Mahogany Creek from the juncture of Summer Camp Creek. (See Photo 17); (3) jams of debris on both creeks, especially Mahogany Creek through the gorge

one (1) mile upstream and on Summer Camp Creek one-half (½) mile upstream from the mouth (See Photos #18, 20 & #22); (4) complete disappearance of the stream beneath undercut banks and clumps of tree roots in the same areas (See Photo #22); (5) also considered an obstruction to fish travel was the very shallow braided water of Mahogany Creek approximately one (1) mile above the junction with Summer Camp Creek (See Photo #12).

7. Pools & Riffles

The riffle to pool ratio of 3 to 1 in Mahogany Creek and 4 to 1 of Summer Camp Creek are almost ideal ratios, however, the pool quality is not good. No pools rated No. 1 on the rating system and there were no Class #2 pools on Summer Camp Creek (See appendix for rating criteria). Because of the small size of these creeks, the low rating of the pool quality is especially important. In creeks of this size, pools should definitely fall in the first two (2) classes if they are to offer adequate resting protection and shade to fish. In the case of Mahogany Creek only 30% of the pools were of Class #2 quality. Pools are a definite need for fish which, according to BSF&W, spend up to two (2) years in the stream before entering the lake.

8. Stream Cover

As shown on Table #2 of the Nevada Department of Fish

and Game report, cover which shades the creek is brush and trees; access 60% of the time on Mahogany Creek and 65% of the time on Summer Camp Creek. These are pretty good percentages of cover although there are some completely open areas on Mahogany Creek which combines the bad points of a shallow and braided stream channel. This results in warming of the water and provides absolutely no habitat for fry although the area has a good gravel bottom and could probably be used in the spring of the year for spawning when water levels are high.

9. Watershed

A limited reconnaisance of the Mahogany Creek watershed by Ed Dimick, District Watershed Specialist, found that the big sage areas are in relatively good condition, however, the low sage and aspen areas are in moderate condition. In general, the watershed was judged to be in a Class 3 condition, BLM Manual 7322 (See appendix). There is a wide distribution of perennial grasses on the watershed which should respond quickly to grazing management.

SUMMARY AND RECOMMENDATIONS

Analysis of major portions of this stream and its watershed indicates that they are not in a healthy state at the present time but do possess a definite potential for improvement.

The stream productivity is limited mainly by its size and volume of flow which are probably not subject to much improvement in spite of watershed improvements. Likewise the chemistry of the stream, the bottom types and the vegetative cover or overstory are suitable and in good condition for trout production. There are a number of deficiencies in the habitat that presently limit the production of fry, these include in order of importance:

1. Barriers to upstream fish travel - two (2) four (4) to eight (8) foot falls plus four (4) foot falls at the ends of the eroding channels on both branches of Mahogany Creek.
2. Erosion from unstable banks, roads and cattle trampled areas feeding silt which is destructive to the eggs (spawn). This occurs especially in the spring, which is the spawning time of the trout.
3. Lack of good quality pools to provide hiding and resting places for both the adult, young of the year and fry fish. This is a critical problem throughout the stream length.
4. Trash and debris in the stream beds which produce barriers to upstream fish migration.

5. Poor watershed condition - the low sage areas which make up a majority of the vegetative types is rated in moderate condition.

A problem of land ownership and administration is present which will prevent important improvement of the stream unless agreements on development can be reached with the land owners or possible exchanges or easements worked out. There must also be coordination between the BLM-NDF&G and the BSF&W and BIA who are working with and administrating the habitat on the Summit Lake Indian Reservation.

Certain steps, such as channelization, must take place on the Reservation portion of the creek to insure easier upstream movement of fish and that improvements made on the upper portions of the creek will have a chance to influence production.

It is recommended that:

1. The private land owner, Gordon Van Vleck, who controls much of the creek where habitat has deteriorated, be approached in an effort to (a) exchange the lands along the creek, or (b) grant an easement or agreement for their improvement.
2. The obstructions, including trees, brush, trash and debris, preventing upstream movement of spawning fish be removed or bypassed.
3. The eroding banks and unstable areas be stabilized to prevent siltation.

4. The pool quality of five (5) miles of Mahogany Creek and Summer Camp Creek above the Reservation fence be upgraded immediately and the upper reaches examined for later possible pool development.
5. The watershed and stream banks be upgraded to optimum conditions through incorporation of the area into a grazing system.
6. An analysis system to document the results of the above recommendations be set up and include:
   a. Measurement of fry production.
   b. Regular chemical and turbidity measurements.
   c. Repeats of the transect study.
7. Limited portions of the creek banks in unstable areas be fenced to exclude livestock use permanently.
8. A foot trail be constructed through the thick brush in the gorge.
9. The gorge be fenced at both ends and the one area in the center where cattle have access to the stream.

MANAGEMENT OBJECTIVES

. There is one primary objective to be reached: insurance of the preservation of the Lahontan Cutthroat trout, _Salmo clarki henshawi_ , a rare and endangered species, in its natural habitat.

A secondary objective is to improve the potential of the spawning habitat of the Lahontan Cutthroat trout to provide habitat for 1,200 spawning pairs which could produce a minimum of 9,600 and under optimum conditions, 84,000 returning fingerlings to Summit Lake as compared to the current BSF&W estimate of 1,800 fingerlings.

METHODS OF MANAGEMENT AND RESPONSIBILITIES

Livestock Grazing

The Mahogany Creek watershed should be contained in one pasture of a three (3) pasture rest-rotation system on the summer range of the Soldier Meadows Grazing Unit. This would provide complete rest for the area for one year, rest until seed ripe one year and complete use for one year on a repetition cycle. (See map).

Since the watershed contains many scattered and remnant stands of perennial grasses, it should respond quite rapidly to a rest-rotation treatment and put the watershed in a very good condition within a relatively short time - five (5) years. This will heal some of the eroded and punctured banks of the streams and increase stream bank cover. Steep or badly eroded sections of the stream bank will definitely need additional rehabilitation through physical or mechanical means.

Wildlife Use

Because of the small size of the stream, its primary value for spawning, and the nature of the fish population, which for the most part only spend their juvenile lives in the stream, there is little likelihood of sport fishing in the stream. The stream is presently closed to fishing by the Nevada Department of Fish & Game.

The watershed is used by deer, sagegrouse and chukar which should all benefit from the grazing system established to protect the watershed and stream system.

Timber Management

There is no commercial timber on the watershed. Scattered aspen groves occur on the slopes and willow, chokecherry and cottonwood occur in thickets along the creek. From a management standpoint, some of the aspen might be manipulated through cutting or spraying to benefit the deer population. Any spray would have to be fully evaluated as to its effect on fish eggs and fry before use.

Mechanical bank stabilization and sloping in some stream bank areas may require re-establishment of trees along such areas.

Habitat Development or Improvement

The following jobs or developments are an intergral part of the habitat improvement for Mahogany Creek:

1. Rest - rotation grazing

	Units	Estimated Cost
Fencing	30 mi.	$45,000.00
Spring Development	15	12,000.00
Reservoirs	15	12,000.00
MM	10	10,000.00
	Total	$79,000.00

2. Stream Improvement

   a. Erosion Control Structures - one timber or gabion Structure to control head cuts on both Mahogany Creek and Summer Camp Creek. (see diagram 3).

	Units	Estimated Cost
Structures	2 @ $2,500 2 MM	$5,000.00
	Total	$5,000.00

   b. Fish ladders or major obstruction removal

   Option (1) Blasting Rock obstructions in the gorge.

Units	MM	Estimated Cost
1		$200.00

Option (2) Fish Ladders

Units	MM	Estimated Cost
1	1	$1,000.00

c. Minor obstruction, trash and litter removal on approximately two (2) miles of Mahogany and Summer Camp Creek including stream banks.

Units	MM	Estimated Cost
2 Mi.	2	$1,500.00

d. Stabilize approximately 3/4 mile of stream bank when rest-rotation is not effective through riprapping, timbering, resloping and seeding (See diagrams 1 & 2).

Units	MM	Estimated Cost
3/4 Mi.	6	$12,000.00

e. Rechannel approximately 100 yards of Mahogany Creek at braided and shallow portions.

Units	MM	Estimated Cost
100 Yds.	1/2	$500.00

f. Upgrade or construct new pools of class I quality over five (5) miles of Mahogany Creek and Summer Camp Creek. (See appendix diagrams)

Units	MM	Estimated Cost
200 Pools	6	$8,000.00

Access Development Improvement and Management

1. Stabilize the road for Stanley Camp to Summer Camp to prevent silt from entering Mahogany Creek at the crossing.

Units	MM	Estimated Cost
100 Yds Grading 2 Culverts	1/2	$1,200.00

Land Acquisition Classification and Withdrawel

1. Try to exchange for Parcels I, II, III & IV, V, & VI with the Van Vleck Ranch. If exchange is not possible, seek an improvement and management easement and agreement for the creek area. This should be coordinated with the possible need for exchange with the same rancher for limited acreage around the Soldier Meadows Desert Dace Habitat Area.

Units	MM	Estimated Cost
680 Acres	2	$2,000.00

RESPONSIBILITIES

1. Bureau of Land Management

The BLM will have the major responsibility to provide the physical improvements necessary to implement this plan. It will also be responsible in cooperation with the operators using the area to make the rest-rotation system function correctly.

The BLM will be responsible for taking the lead in possible land exchanges or cooperative agreements with private land owners that may be necessary.

Evaluation of the effectiveness of the plan will be conducted jointly by the BLM, Nevada Department of Fish & Game and the Bureau of Sport Fisheries and Wildlife.

2. Nevada Department of Fish and Game

Continued information concerning the population, spawning use and success and fry production will be needed from the NDF&G to evaluate the effectiveness of the plan.

3. Bureau of Sport Fisheries & Wildlife - Bureau of Indian Affairs

Completion of this plan will depend on BSF&W-BIA completion of habitat improvement on the Reservation portion of the creek. BSF&W will also be expected to furnish information on spawners leaving the lake and escapement of fry to the lake to aid in evaluation of the habitat improvement.

BIBLIOGRAPHY

BLM Manual, 6762

Fishes and Fisheries of Nevada, Ira La River, 1962, Pgs. 172-176 Pgs 282-295.

Freshwater Fishery Biology, Lagler, Karl.

Practice of Water Pollution Biology (the), U. S. Dept. of Interior, Federal Water Pollution Control Administration, Division of Technical Support 1969.

Reconnaissance Report, Fisheries Management Program, Summit Lake Indian Reservation, BSF&W, 1968

Technique for Sampling General Fish Habitat Characteristics of Streams, Herrington, Roscoe B., & Dunham, Donald K., U. S. Forest Service Research Paper INT-41, 1967.

PSC-360
September, 1969

Wildlife Habitat Management Plan
Checklist *

Inventory and Analysis (1605, 6611 and 6612)

- ✓ Has a URA been prepared for this area
  - ✓ Is pertinent data summarized in appendix
  - ✓ Is the data properly referred to
- ✓ Have habitat problems been identified
- Were management recommendations developed before preparing plan (6612.3 and 1608.11)

Coordination

- ✓ Is cooperation with appropriate State wildlife agency acknowledged
  - ✓ Was the State invited to cooperate in plan preparation
  - ✓ Was the State invited to review the plan
  - Was the State invited to participate financially in implementation of the plan
  - If necessary, is there a supplemental agreement or Memorandum of Understanding
  - If appropriate, is the plan coordinated with other agencies, groups or individuals who control important habitat

Introduction

- ✓ Is the introduction brief but adequate
- ✓ Is a small location/orientation map included
- Are applicable management decisions and directives (from the Management Framework Plan) stated
- Are support recommendations identified (1608.12)
- ✓ Are the important wildlife species identified
- ✓ Are the species covered in this plan clearly identified

Objectives

- ✓ Are objectives stated in concise, specific terms
- ✓ Are they expressed quantitatively whenever possible
- ✓ Do objectives appear to be technically sound and realistic

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* Line items checked (✓) are adequate. See attached narrative for further comments.

Management Methods

✓ Are methods related to objective attainment
Are methods described in sufficient detail for implementation
Are restrictions on other users (approved in MFP) clearly stated
✓ Is the plan coordinated with AMP or Timber management plan, if appropriate
✓ Are desired population levels of principal wildlife species identified
✓ Are proposed habitat developments listed
- Are these projects coordinated with Watershed Plans
- ✓ Are project details included in Appendix

Are access needs specified, if any
✓ Are land status action needs specified, if any
✓ Are Watershed land treatment proposals coordinated

Evaluation

✓ Is evaluation of the plan provided for
Are the study procedures identified
Are the times for conducting evaluation specified
Are manpower and cost estimates presented

Implementation

✓ Is the time schedule and cost estimate included
Is the program package format included
Are coordination or deadline considerations shown

Review

Is provision made for plan revision

Maps

✓ If included, are maps and overlays adequate
- ✓ Is URA data utilized
- Is important habitat of all significant wildlife populations shown
- Does the WHA boundary appear to be correctly located
- ✓ Does the WHA include yearlong range of the principal populations
- If not included, are maps listed and identified as to content and where filed

Approval

✓ Is there an approval sheet with: Title, Author, Cooperators,
✓ Review signature lines, Approval line

U.S. FOREST SERVICE RESEARCH PAPER INT-41
HERRINGTON, ROSCOE B., & DUNHAM, DONALD K.,

Pool quality recognition guide

Pool			
Quality class no.	Length or Width	Depth	Shelter[1]
1	Greater than a.c.w.[2]	2′ or deeper	Abundant[3]
	Greater than a.c.w.	3′ or deeper	Exposed[4]
2	Greater than a.c.w.	2′ or deeper	Exposed
	Greater than a.c.w.	<2′	Intermediate[5]
	Greater than a.c.w.	<2′	Abundant
3	Equal to a.c.w.	<2′	Intermediate
	Equal to a.c.w.	<2′	Abundant
4	Equal to a.c.w.	Shallow[6]	Exposed
	Less than a.c.w.	Shallow	Abundant
	Less than a.c.w.	Shallow	Intermediate
	Less than a.c.w.	<2′	Intermediate
	Less than a.c.w.	2′ or deeper	Abundant
5	Less than a.c.w.	Shallow	Exposed

[1] *Logs, stumps, boulders, and vegetation in or overhanging pool, or overhanging banks.*
[2] *Average channel width.*
[3] *More than ½ perimeter of pool has cover.*
[4] *Less than ¼ of pool perimeter has cover.*
[5] *¼ to ½ perimeter of pool has cover.*
[6] *Approximately equal to average stream depth.*

worker waded along the transect. Therefore, it was impractical to detect any bottom type less than 1 foot long. The combined lineal footage of each type of bottom material was measured and recorded to the nearest foot for each channel. Width of the stream bottom was considered equal to the width of the stream surface.

BANK STABILITY

Bank conditions at each end of a transect were rated either as "stable" or as "unstable." (1) An "unstable" rating was given if there was any evidence of soil sloughing within the past year. (2) The number of stable banks for each transect was recorded as 0, 1, or 2. (3) On multiple channels, only the two outermost banks were rated.

STREAMSIDE VEGETATION

Three types of streamside vegetation were recognized: "forest," "brush," and "open." Forest was defined as stands of trees. Other woody vegetation was defined as "brush," and banks without woody types of vegetation were rated as "open." Recognition of these three vegetation types was largely based on subjective judgment; no specific measurements were made. The field crews estimated which type predominated over an area approximately two hundred feet square at each end of the transect above the high-water mark. In making their judgment, the field crews used aerial photos along with visual estimation of ground cover.

CHANNEL GRADIENT

Two gradient readings were taken using a hand level: one reading one hundred feet upstream from the sample point and the other one hundred feet downstream. The average of these two readings (ignoring the minus sign of the downstream reading) was recorded as the gradient of the sample point.

STREAM LENGTH

On the aerial photos, the field crew identified and marked either (1) the origin of the stream (at a lake or spring) or (2) the point at which the average stream width became less than 4 feet — whichever was encountered first while working upstream. This point often was downstream of the stream's beginning point — originally marked as a correction

SOIL SURFACE FACTORS

The five classes of erosion activity are described in 7317 and have been included in this release for convenient use. These are also photographically shown in Appendix 2.

1. Class 1 - Stable. Soil surface factor 0-32.

   --There are no signs of soil movement.
   --Surface litter is usually accumulating in place.
   --Erosion pavement, if present, will be evenly distributed over the area.
   --No pedestalling is apparent.
   --No rills are apparent.
   --No flow patterns are apparent.
   --Gullies may be present in a stable condition. (See photo 5, 6, 7, 8, 9 Appendix 2).

2. Class 2 - Slight. Soil surface factor 32-49.

   --Some movement of soil particles is apparent.
   --Erosion pavement may be present but collection of small particles may be spotty.
   --No pedestals are apparent.
   --Rills less than 1/2-inch deep occur at infrequent intervals of more than 10 feet.
   --Visible flow patterns have been formed by surface water. Deposition of pavement particles may appear in flow patterns.
   --Gullies may be present, but with little evidence of streambank or streambed erosion. (See photo 10, 11, 12, 13, 14 Appendix 2).

3. Class 3 - Moderate. Soil surface factor 49-59.

   --Moderate movement of soil is plainly visible and recent. Moderate movement can be recognized by slight terracing caused by the accumulation of material deposited against litter, vegetation or rocks. The terraces will generally be less than 1 inch in height.
   --Moderate movement of litter is apparent.
   --Some erosion pavement and/or rock may be exposed in bare spots where fine soil particles have been recently removed by wind and/or water.

--Small rocks and plants on pedestals occurring in the flow patterns may be noticed. Pedestalling should not be confused with frost heaving or mechanical compaction in this situation.
--Small rills are apparent in exposed places. These rills will be between 1/2 and 6 inches deep at intervals of approximately 10 feet.
--Sediment deposits are visible intermittently in flow patterns and against small obstructions elsewhere.
--Moderate movement of soil is plainly visible and recent. Moderate movement can be recognized by slight terracing caused by the accumulation of material deposited against litter, vegetation or rocks. The terraces will generally be less than 1 inch in height. (See photo 15, 16, 17, 18 Appendix 2).

4. Class 4 - Critical. Soil surface factor 59-65.

--The soil mantle is in a critically eroded condition.
--Soil movement occurs with each runoff. Transported soil and debris caused by wind and water is deposited throughout the area against minor surface obstructions.
--Extreme movement of litter is apparent.
--Recent erosion pavement is well formed on gravelly and stony soils.
--Small rocks and plants on pedestals are generally evident and roots are exposed.
--Large rills are apparent in exposed places.
--Flow patterns contain easily noticeable silt and sand deposits and alluvial fans.
--Actively eroding gullies are present on 10 to 50 percent of the area being considered. (See photo 19, 20, 21, 22 Appendix 2).

5. Class 5 - Severe. Soil surface factor 65-70.

--Soil mantle is in a severely eroded condition. There is exposed subsoil in and out of gullies.
--Sharply incised gullies and large barren fan deposits are present. Wind scoured depressions, active wind cutting and embryonic dunes in sandy situations may be present.
--Very little litter is in evidence.
--Small rocks and plants are pedestalled.
--Rills, when present, will be 3 to 6 inches deep and at intervals of less than 5 feet.
--Actively eroding gullies are present on 50 to 100 percent of the area being considered. (See photo 23, 24 Appendix 2).

WATERSHED CONSERVATION AND DEVELOPMENT FIELD DATA

Watershed Mahogany Cr	Date 5-13-70	Examiner [illegible]	Range Survey No.
Type 4 [illegible] Feid	Acres	Location of Transect Sec. 22 T42N R23E	Transect No. 1

Transect Data	Hits	Total
Big [illegible] Grass Forbs Vegetation		33
Litter		10
Pavement		17
Rock		7
Bare Ground		33
TOTAL		100

Soil Surface Factor Data

Item	1 STABLE	2 SLIGHT	3 MODERATE	4 CRITICAL	5 SEVERE	TOTAL
Soil Movement					5	
Litter Movement			3			
Pavement		2				
Pedestalling			3			
Rills			3			
Gullies			3			
Flow Patterns				4		
TOTAL						

Soil Data:	0"-4"	4 to 15
Color		
P H		
Texture	fgl 2	vgcL - 3
Parent Material	Andesite-Obsidian	

$\frac{23}{7} = 3.3$

Surface Factor 52

Stable 0-32, Slight 32-49, Moderate 49-59, Critical 59-65, Severe 65-70.

Slope

Exposure

Treatment Need	Primary - 1 High - 2, Med - 3, Little -4
Vegetal Manip	
Watershed Tillage	
Water Control	2
Restricted	2
Management	1 2

SUMMARY
Writeups and Acres Represented

% of Subtype

Transect Identification

TOTAL

WATERSHED CONSERVATION AND DEVELOPMENT FIELD DATA

Watershed Melogamy	Date 5-13-70	Examiner ZBes-GFd JW	Range Survey No.
Type 4-Artr-Agsp	Acres	Location of Transect Sec. 2 T4N R26E	Transect No. 2

Transect Data	Hits	Total
Vegetation	[illegible]	
Litter		
Pavement		
Rock		
Bare Ground		
TOTAL		

Soil Surface Factor Data

Item	1 STABLE	2 SLIGHT	3 MODERATE	4 CRITICAL	5 SEVERE	TOTAL
Soil Movement			3			3
Litter Movement		2				2
Pavement	1					1
Pedestalling		2				2
Rills		2				2
Gullies	1					1
Flow Patterns		2				2
TOTAL						13

Soil Data:	0"-4"	4 to
Color		
P H		
Texture	vcl	
Parent Material		

$\frac{13}{7} = 1.9$

Surface Factor 31 ~~5~~ 33

Stable 0-32, Slight 32-49, Moderate 49-59, Critical 59-65, Severe 65-70.

Slope

Exposure

Treatment Need	Primary - 1 High - 2, Med - 3, Little -4
Vegetal Manip	
Watershed Tillage	
Water Control	
Restricted	
Management	

SUMMARY

Writeups and Acres Represented

% of Subtype

Transect Identification

TOTAL

WATERSHED CONSERVATION AND DEVELOPMENT FIELD DATA

Watershed [illegible]	Date 5-13-70	Examiner [illegible]	Range Survey No.
Type C 4 Mile - [illegible]	Acres	Location of Transect SEC 35, T42N R26E	Transect No. 3

Transect Data	Hits	Total
Vegetation	Very Good Fair to good	
Litter		
Pavement		
Rock		
Bare Ground	fs L	
TOTAL		

Soil Surface Factor Data

Item	1 STABLE	2 SLIGHT	3 MODERATE	4 CRITICAL	5 SEVERE	TOTAL
Soil Movement		-	3			5
Litter Movement			4			4
Pavement	1					1
Pedestalling		-	3			3
Rills		2				2
Gullies	1					1
Flow Patterns			3			3
TOTAL						17

Soil Data:	0"-4"	4 to
Color		
P H		
Texture		
Parent Material		
Treatment Need	Primary - 1 High - 2, Med - 3, Little -4	
Vegetal Manip		
Watershed Tillage		
Water Control		
Restricted		
Management		

$\frac{14}{7}$ = 2.6

Surface Factor 43

Stable 0-32, Slight 32-49, Moderate 49-59, Critical 59-65, Severe 65-70.

Slope 10 %

Exposure

SUMMARY

Writeups and Acres Represented

% of Subtype

Transect Identification

TOTAL

N4-7330-12A

WATERSHED CONSERVATION AND DEVELOPMENT FIELD DATA

Watershed [illegible]	Date 5-13-70	Examiner [illegible]	Range Survey No.
Type 6 Ospen	Acres	Location of Transect SEC 35. T 42N R25E	Transect No. 4

Transect Data	Hits	Total
Vegetation	[illegible] Alm	
Litter	poor range	
?avement		
ock		
are Ground	fsL	
TOTAL		

Soil Surface Factor Data

Item	1 STABLE	2 SLIGHT	3 MODERATE	4 CRITICAL	5 SEVERE	TOTAL
Soil Movement				4		4
Litter Movement			3			3
Pavement	1					
Pedestalling		2				2
Rills			3			3
Gullies	1					
Flow Patterns				4		
TOTAL						

Soil Data:	0"-4"	4 to
Color		
? H		
.exture		
?arent aterial		

$\frac{23}{7} = 3.3$

Surface Factor 52

Stable 0-32, Slight 32-49, Moderate 49-59, Critical 59-65, Severe 65-70.

Slope [illegible]

Exposure

Treatment Need	Primary - 1 High - 2, Med - 3, Little -4
egetal Manip	
atershed illage	
ater ontrol	
tricted	
agement	

SUMMARY

Writeups and Acres Represented

% of Subtype

Transect Identification

TOTAL

R4-7330-12A

WATERSHED CONSERVATION AND DEVELOPMENT FIELD DATA

Watershed	Date 5-13-70	Examiner	Range Survey No.
Type 6	Acres	Location of Transect Sec 28 T42N R26E	Transect No. 5

Transect Data	Hits	Total
Vegetation		
Litter		
Pavement		
ock		
are Ground		
TOTAL		

Soil Surface Factor Data Item	1 STABLE	2 SLIGHT	3 MODERATE	4 CRITICAL	5 SEVERE	TOTAL
Soil Movement					5	5
Litter Movement					5	5
Pavement		2				
Pedestalling				4		
Rills			3			
Gullies	1					
Flow Patterns				4		
TOTAL						

Soil Data:	0"-4"	4 to
Color		
? H		
exture		
arent aterial		

____ = 4 ____

7

Surface Factor 53

Stable 0-32, Slight 32-49,
Moderate 49-59, Critical 59-65,
Severe 65-70.

Slope

Exposure

Treatment Need	Primary - 1 High - 2, Med - 3, Little -4
egetal Manip	
atershed illage	
ater ontrol	
stricted	
gement	

SUMMARY

Writeups and Acres Represented

% of Subtype

Transect Identification

TOTAL

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Division of Fishery Services
Reno, Nevada

Reconnaissance Report

FISHERY MANAGEMENT PROGRAM

Summit Lake Indian Reservation
Humboldt County, Nevada
October 16-20, 1967
June 30, 1968

Reconnaissance Report
Fishery Management Program
Summit Lake Indian Reservation
Nevada

INTRODUCTION

The Summit Lake Indian Reservation is located in sparsely inhabited northwestern Nevada. Cedarville, California, with a population of 250, is the largest community within a 75-mile radius of Summit Lake. The Reservation covers 10,500 acres at an elevation of about 6,000 feet. Most of this acreage is sagebrush-grass range except for developed meadow areas on both Mahogany and Snow Creeks. These creeks which flow off the west slopes of Mahogany Mountain feed 560-acre Summit Lake, which contains the only known genetically pure strain of Lahontan cutthroat trout (Salmo clarkii henshawi) within the Lahontan drainage system.

An estimated 50 people of Paiute descent are members of the Summit Lake Tribe. Because of the lack of jobs and poor access during the winter and spring months, there are no permanent Reservation residents, and only three or four members are residents on a seasonal basis. Presently, the only source of tribal income is a pasture-range lease from which the Tribe realizes $6,600 annually.

A letter requesting fishery management assistance was received from the chairman of the Summit Lake Paiute Council in December, 1965, and an agreement that the Bureau of Sport Fisheries and Wildlife would provide the assistance necessary to manage the fishery resource was completed in September, 1967.

In keeping with this agreement, an initial survey of Reservation waters was completed during the week of October 15. The purpose of this report is to summarize the findings of the survey, and outline future management programs that will benefit the fishery resource and ultimately provide additional income and employment for tribal members.

PAST MANAGEMENT ACTIVITIES

In 1956, the Nevada Fish and Game Commission initiated the collection of cutthroat trout spawn on Mahogany Creek. This operation was continued until 1967 at which time the State informed the Tribe they would no longer require Summit Lake eggs. A compilation of the results of this operation (Table 1) shows that between 785 to 1,182 fish were taken during those years when an effort was made to trap the entire spawning run. The take varied from 450,000 to 750,000 eggs with 100-300 fish of each sex being released upstream to spawn. The only known release of hatchery-reared cutthroat trout into the Summit Lake watershed was made in September, 1959, when 80,000 fry of Summit Lake strain were stocked in Mahogany Creek by the Nevada Fish and Game Commission.

The Summit Lake cutthroat is considered a pure strain and has been of considerable interest to biologists involved with trout taxonomy. Behnke (1960) in a study of cutthroat trout of the Great Basin concluded that the Summit Lake fish were a pure type of Lahontan cutthroat trout. A serological study comparing the Summit Lake and Catnip Reservoir populations by Utter and Ridgway (1966) indicated inbreeding and homogeneity in the Summit Lake population.

Tribal restrictions prohibit non-Indian sport fishing in either Summit Lake or Mahogany Creek. Some harvest is conducted by the Indians who historically gaffed fish in the creek during the spawning run. The number of fish harvested annually is not known. In 1965 and 1966, the Council enforced an ordinance prohibiting fishing and hunting on the Reservation by non-tribal members. During 1967 an unlimited harvest by Indians was allowed.

SURVEY FINDINGS

Mahogany Creek

Approximately seven miles of Mahogany Creek, the principal spawning tributary to Summit Lake, was surveyed in October 1967 to determine extent and condition of spawning and nursery areas. In addition, six test sections totaling 980 feet were sampled with electrofishing gear to determine relative numbers of fish and their distribution within the drainage.

The majority of Mahogany Creek surveyed (5 miles) provides favorable spawning and rearing habitat; however, the lower portion of the creek within the Reservation rapidly deteriorates. About two miles upstream from Summit Lake, an irrigation structure was found diverting about 50% of the flow into adjacent meadow lands. This structure reduces water velocities and has caused aggradation of the creek bed both upstream and downstream for about 100 yards. Below this structure there are several irrigation ditches and cattle traffic that have caused the natural channel to become ill defined. At this point, the remaining water percolates into the ground. Within about one-half mile of the lake, the natural channel is again well defined but the flow merges into a delta as it approaches the lake. Interviews with local residents indicate that water only reaches the lake during periods of high run-off. During spring run-off, the creek spreads over the lower meadow lands. Considerable numbers of adults and returning trout yearlings are lost in this area where the natural channel is not well defined.

Mahogany Creek Gorge, approximately three and one-half miles upstream from Summit Lake, is an area that could be an obstacle to migrating fish. The gorge confines the creek to a narrow rocky channel that presently contains three falls (3-6 feet in height) and several debris barriers. Though

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adequate spawning and rearing habitat exists above the gorge, only one young cutthroat trout was collected; whereas, a total of 113 young were collected below the gorge (Table 2).

The fish ranged in size from 1.8 to 6.9 inches with 80% in the 2.0 to 2.5 inch class. An examination of scales revealed that most of the fish were young-of-the-year. The largest fish collected (6.9 inches) exhibited one annular mark which indicates that some fish will remain in the creek for two years before returning to the lake. The condition of these fish was excellent. It was estimated that about 1,800 trout were in the seven miles of creek surveyed. The highest density occurred in the lower reaches of the creek within the Reservation.

Summit Lake

Fish population samples were taken at Summit Lake by use of set nets. Plankton samples were also collected and a partial chemical analysis of lake water constituents was made. Gill net sets resulted in a catch of 85 fish ranging in length from 7.0 to 23.0 inches and weighing .08 to 5 pounds respectively. All fish were in excellent condition and gross examination disclosed no parasite problems. Based upon analysis of scale samples it was found that two-year fish ranged between 7 and 12 inches; three-year fish from 15 to 20 inches; and four-year fish from 21 to 23 inches. It appears that the 1965 year class is dominant.

There was a rich abundance of zooplankton in the open waters. Large quantities of zooplankton were associated with the extensive beds of aquatic plants present around the edge of the lake. These areas provide ideal nursery habitat for young fish. Water analysis during October showed no significant differences between surface and bottom waters. The maximum depth found was 28 feet, which was three feet deeper than maximum depth reported by La Rivers (1962), and the lake level was about five feet below the high-water line of the recent past.

DISCUSSION

It is evident that Summit Lake is capable of supporting an abundant cutthroat trout population. The total alkalinity of the water is conducive to high production, an abundant food supply exists, and trout growth and general body condition are excellent. Production in Mahogany Creek can be significantly increased through modification of the existing irrigation system, fencing of the lower stream to exclude cattle, screening of diversions, channelization of certain stream sections, and distribution of adults or eggs above the gorge.

Present recruitment to the lake appears to be extremely small and entirely inadequate to support a fishery. It is estimated that only 1,800 young-of-the-year fish were present in Mahogany Creek during October. This estimate probably represents the maximum number of fish of the 1967 year class that will enter the lake, since past studies reveal that the majority of downstream fingerling migration does not occur until the following spring run-off.

Normally a stocking rate of 500 advanced fry or 100 to 300 fingerlings per acre is needed to maintain adequate population levels in trout fishing lakes. An estimated 280,000 fry or 56,000 fingerlings are needed to maintain an adequate cutthroat fishery in Summit Lake. Thus, a substantial increase in recruitment is of prime importance to maintain the Summit Lake fishery. A significant increase in the number of spawners or amount of spawner escapement would be beneficial. Approximately 132,000 square feet of streambed is available in the creek and about 50% of this area is suitable for spawning. An estimated 1,200 spawning pairs can be accommodated in the creek. These fish would produce between 9,600 (0.4% survival) and 84,000 (35.0% survival) returning fingerlings. The lower value would probably represent the most realistic survival estimate.

If later investigations show that the gorge is definitely a barrier to upstream migration the maximum number of fish released to the creek for natural spawning should approximate 200 of each sex. It would also be desirable to plant 100,000 eyed eggs above the gorge in order to realize the full productive capacity. Planting of eggs would be preferred over transportation of spawners to the upper area because the resultant egg-to-fry survival would be higher than natural spawning.

Since the goal is to increase the population as rapidly as possible and approach a stocking rate of 100 fingerlings per surface acre, this experimental program should be fully evaluated. If it is found that recruitment still remains inadequate, either an increase in the number of eyed eggs planted or the number of spawners released upstream from the egg taking station may be necessary. Consideration will be given to stocking fry directly into the lake.

FUTURE DEVELOPMENT POTENTIAL

Even though annual income derived by tribal members from Summit Lake is presently low it could provide an excellent sport fishery of substantial economic importance to the Tribe. Knotte Creek Reservoir, within 15 miles of Summit Lake, is a 50-acre body of water which provided approximately 4,500 angler-days of fishing during 1967 even though access is poor. By comparison, fishing pressure at Summit Lake could exceed 20,000 angler-days per year.

If the Tribe wishes a recreation sport fishery program on Summit Lake, the development of recreation facilities should be considered. Such facilities would be an added attraction and could produce a major cash income for the Tribe with associated employment benefits to tribal members. With recreation facilities, an individual fisherman will spend around $4 to $6 a day compared to $0.25 to $0.65 per day in areas where only permits are offered and where goods and services are not available. With full development the Tribe could ultimately expect a gross annual income between $80,000 and $100,000. The coordinated efforts of the Tribe, the Bureau of Indian Affairs and Bureau of Sport Fisheries and Wildlife would be necessary.

FISHERY MANAGEMENT RECOMMENDATIONS

1. A restoration plan for lower Mahogany Creek should be developed and the necessary work accomplished as soon as possible to prevent fish losses in the irrigation system and to improve fish passage.

2. During 1968, a trapping and egg incubation facility should be established on Mahogany Creek to initiate rehabilitation of the fishery.

3. For the section of Mahogany Creek below the gorge, 200 spawning fish of each sex should be released.

4. Approximately 100,000 eyed eggs should be planted in the section above the gorge.

5. Field studies designed to evaluate results of this plan should be completed in 1968 and recommendations based upon these findings made for the 1969 spawning season.

6. Pending further studies, the Tribe should consider limiting the harvest of spawners by tribal members and prohibit harvest by non-tribal members.

7. A sport fishery should not be allowed until the fish population is of suitable size.

Fishery Management Biologist
Date: JUN 30 1968

D. H. Rasmussen
Regional Supervisor
Division of Fishery Services
Date: Aug. 21, 1968

Distribution:
- 2 Central Office
- 1 Phoenix Area Office, BIA
- 2 Nevada Indian Agency, BIA
- 8 Summit Lake Paiute Council
- 3 Reno Field Office
- 2 Reg. Office - F.S.
- 1 Reg. Office - F.H.

TABLE 1. Number of fish trapped and number of eggs taken by the Nevada Fish and Game Commission on Mahogany Creek, Summit Lake Indian Reservation, 1956-1966.

Year	Trapping Period	No. Fish Trapped	No. Eggs Taken
1956	--	1,182	750,000
1958	--	--	383,000
1959	3/23 - 5/14	870	687,000
1961	--	--	43,000
1962	4/20 - 5/15	826	448,000
1963	4/23 - 5/18	785	627,000
1964	--	--	624,000
1965	4/29 - 5/6	129	80,000
1966	4/16 - 4/26	232	221,000

TABLE 2. Number of fish collected above and below Mahogany Creek Gorge.

Area	Number of Test Sections	Total Length of all Test Sections (in feet)	Average Width (in feet)	Number of Fish
Above Gorge	3	245	2	1
Below Gorge	3	245	3	113

REFERENCES

Behnke, Robert J., 1960, Taxonomy of the Cutthroat Trout of the Great Basin, M. A. Thesis, University of California, Berkeley, Department of Zoology.

La Rivers, 1962, Fishes and Fisheries of Nevada, Nevada State Fish and Game Commission, State Printing Office, Carson City, Nevada, 782 pp.

Utter, Fred M., George J. Ridgway, and James W. Warren, 1966, Serological Evidence for Inbreeding of Lahontan Cutthroat Trout, Salmo clarkii henshawi, in Summit Lake, Nevada, California Fish and Game, 52(3): 180-184.

NOTES ON DON KINGS REPORT ON LAHONTAN CUTTHROAT — JAN 21, 1969

PLANTING NOW 35,000 FISH A YEAR SIZE?

MAHOGANY CREEK PRODUCES 1800 YOUNG OF YEAR - EXTREMELY LOW

ARTIFICIALLY INCREASED TO 12,000

90% OF SPAWN ON BLM LANDS ?

SEDIMENT PRESENT IN THE STREAM DURING SPAWN

FEW FISH ABOVE GORGE AREA (3 MILES FROM LAKE)

GORGE IS EFFECTIVE BARRIER WITH 6' FALLS

LAKE IS EXTREMELY PRODUCTIVE — NO OTHER FISH IN LAKE

LAKE IS NOT TO ITS CARRYING CAPACITY

BANK EROSION AS THE RESULT OF CATTLE ACTIVITY

STREAM FENCING NECESSARY PERHAPS

LACK OF GOOD GRAVEL SPAWNING AREAS ON AREA ABOVE GORGE —

MAY REQUIRE ARTIFICIAL CREATION, OF SPAWNING BEDS

SEDIMENTATION MAY BE COMING FROM MINERS ROADS — THESE

SHOULD BE LOOKED INTO — POSSIBLY SEEDED & WATER BARRED

MIDDLE OF MARCH TO MID-MAY BSFW ARE TAKING SPAWN THERE

KING WILL CONTACT BUD BOSHUK IN PORTLAND —

WE SHOULD PLAN TO MAKE AT LEAST 2 TRIPS TO THE AREA

APR - AUG 1970

JOB PROGRESS REPORT

State: Nevada

Cooperators: Bureau of Land Management, Winnemucca District

Project No.: F-20-R-5 Project Title: Statewide Fisheries Management

Job No.: 1Z-1 Job Title: Survey of Mahogany Creek, Humboldt Co.

Period Covered: January 1, 1969 to December 31, 1969

SUMMARY

Mahogany Creek, the primary spawning tributary of the endangered Lahontan cutthroat trout of Summit Lake, was intensively surveyed. A small stream of limited biological potential, its physical quality is relatively good. Heavy livestock use immediate to the stream and several areas of erosion on the stream bed represent the major immediate threats to the stream.

BACKGROUND

Mahogany Creek is the primary spawning tributary of Summit Lake for the Lahontan cutthroat trout *Salmo clarki henshawi*, considered endangered by the U.S. Bureau of Sport Fisheries and Wildlife. The stream has been used as an egg source by the Nevada Fish and Game Department and is used currently by the U.S. Bureau of Sport Fisheries and Wildlife. As a protective measure, that portion of the stream and watershed administered by the U.S. Bureau of Land Management is in the process of being withdrawn from mineral use. Because the area is subject to heavy sheep and cattle use as summer range, the Bureau of Land Management is attempting to establish baselines for the management of the area considering its value for perpetuation of the Lahontan cutthroat. The Nevada Fish and Game was asked to participate with the Bureau of Land Management in a physical survey of the stream and to make recommendations on restoration and management.

Previously available data on the physical condition of Mahogany Creek above the Summit Lake Indian Reservation was quite subjective and supplementary quantitative data were needed. This survey provides basic information for the various resource agencies on the current physical quality of Mahogany Creek.

OBJECTIVES

The primary objective of this survey was to establish the present physical condition of the portion of Mahogany Creek on public lands.

PROCEDURES

Chemical analyses were made at three sites along the stream. These same sites were used to test water turbidity using a colorimeter and to "guestimate" stream flow using the Standard Float Method.

Approximately 2.77 miles of Mahogany Creek and 0.91 miles of Summer Camp Creek, a tributary of Mahogany, were surveyed using the methods of Herrington and Dunham (1967) but with some modifications. Transects were run at 200 foot intervals to obtain more precision on the smaller stream rather than at the recommended quarter mile intervals. Stream depths were taken on every other transect. Cattle trampling and the occurrence of grass cover on the bank were noted for each transect. Cattle trampling was considered to be present if hoofprints were present on the substratum surface in the immediate vicinity of the transect juncture with the bank. Cover occurrence was noted at each transect rather than estimated subjectively. Notes were made of falls, debris, erosion, etc. between transects. This survey system was conducted at the lowest elevations of the stream on public land. Both streams extend for several miles beyond the endpoint of the survey.

Ten days were spent on this project.

FINDINGS

The results of the chemical tests are shown on Table 1 (See attachment 1.) Station A was located 100 feet upstream on Mahogany Creek from the Summit Lake Indian Reservation boundary fence. Station B was 500 feet upstream on Mahogany Creek from its junction with Summer Camp Creek. Station C was 200 feet upstream on Summer Camp Creek from its junction with Mahogany Creek. Turbidity and flow estimates are included on this table. All data represented on this table were obtained on August 12, 1969.

The physical condition of Mahogany Creek as determined by this survey is represented in Table 2 (Attachment 2.) All figures are in percentages except where noted otherwise. Several definitive statements can be made from the data represented. Mahogany Creek is a small stream with limited capacities for fish.

Pools are relatively frequent (23.9%), but are of poor quality. Immediate stream cover is slight (12.0%), but the forest canopy is ample (61.5%). The stream bed is actively eroding with a high occurence of unstable banks (38.0%). Livestock exert a profound influence upon the stream with cattle trampling noted at 59.0% of the transects. A 54.0% occurrence of gravel as a bottom material indicates a large spawning area is available.

Several other statements can be made from notes taken during the survey. Both the Mahogany Creek gorge and a narrow canyon area of Summer

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[illegible] the standard form [illegible]

[illegible]

Camp Creek have several small falls (4-6') and some debris blockages which might hinder fish movements upstream. Both areas are characterized by narrow, rocky channels. Active erosion of the beds of both Mahogany and Summer Camp Creeks is occurring immediately above their conflux. Below this erosion, both streams run for some distance in a gully of from 3 to 6 feet deep. Spawning areas of good quality will be lost shortly to this erosion.

Approximately 700 feet of Mahogany Creek at the upper end of the survey was deeply gullied.

RECOMMENDATIONS

The following recommendations are made.

1. Several days should be spent conducting a less intensive survey of the remaining upper portions of both streams.

2. The two areas of stream bed erosion should receive immediate attention. Elimination of the erosion face and use of riprap could deter further loss of spawning areas. Falls and debris blockages could be removed for easier access for a spawning fish.

3. Controlled access by livestock is recommended to eliminate overuse and damage of the stream bed and immediate area. A rest-rotation grazing system for the watershed might provide the control needed.

Prepared by: Mike Hess

Dated: March 27, 1970

Attachment # 1

TABLE # 1

CHEMICAL ANALYSIS OF MAHOGANY CREEK

STATION	A	B	C
Time	1600	1408	1040
Air Temp.	73°	69°	65°
H_2O Temp.	--	58°	49°
Free Acidity	0	0	0
Alkalinity:			
Phenolphthalein	0	0	0
Methyl Orange	51 ppm	51 ppm	86 ppm
Dissolved Oxygen	8 ppm	8 ppm	10 ppm
Carbon Dioxide	5-10 ppm	5-10 ppm	5 ppm
pH	8.0	7.5-8.0	8.5
Turbidity *	0	0**	2-3
Flow Estimates	2 cfs	1 cfs	<1 cfs

* In Jackson Turbidity Units.

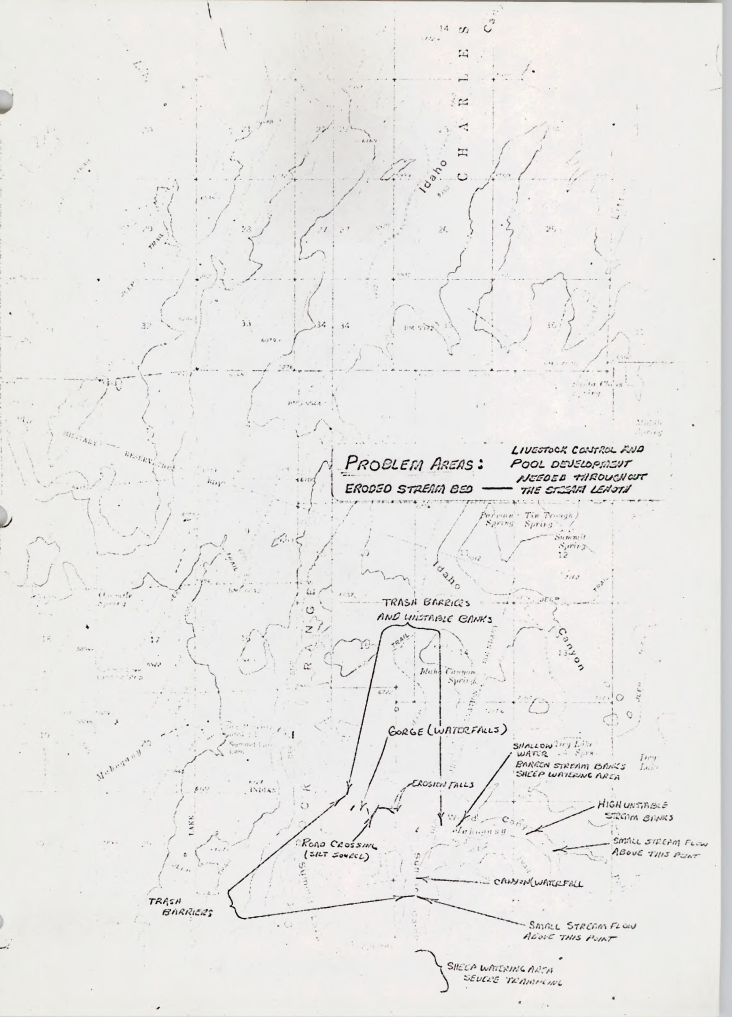
** A second turbidity test was run 20 feet downstream from Station B just below an actively eroding falls. Five Jackson Turbidity Units were registered on the colorimeter at this point.

Attachment # 2

Table # 2

SUMMARY OF STREAM DRAINAGE CHARACTERISTICS

Character	Mahogany	Summer Camp	Combined
No. of Transects	75	25	100
Average Width	62.9"	49.2"	59.4"
Average Depth	4.15"	3.39"	3.95"
Riffle Areas	75.2	79.2	76.1
Pool Areas	24.8	20.8	23.9
Pool Areas by Quality			
1	0	0	0
2	30.5	0	25.4
3	21.4	52.3	26.6
4	39.4	47.7	40.6
5	8.7	0	7.4
Bottom Material by Class			
Boulder	1.3	4.0	2.0
Rubble	33.3	40.0	35.0
Gravel	53.3	56.0	54.0
Sand-Silt	12.0	0	9.0
Other	0	0	0
Stream Cover by Class			
Forest	48.0	54.0	49.5
Brush	12.0	12.0	12.0
Open	39.3	34.0	38.1
Occurrence of Grass at open Sites	66.1	82.4	69.5
Occurrence of Unstable Banks	41.4	28.1	38.0
Occurrence of Cattle Trampling	55.3	70.0	59.0



PROBLEM AREAS:
ERODED STREAM BED — LIVESTOCK CONTROL AND POOL DEVELOPMENT NEEDED THROUGHOUT THE STREAM LENGTH

TRASH BARRIERS AND UNSTABLE BANKS

GORGE (WATERFALLS)

SHALLOW WATER
BARREN STREAM BANKS
SHEEP WATERING AREA

EROSION FALLS

HIGH UNSTABLE STREAM BANKS

ROAD CROSSING (SILT SOURCE)

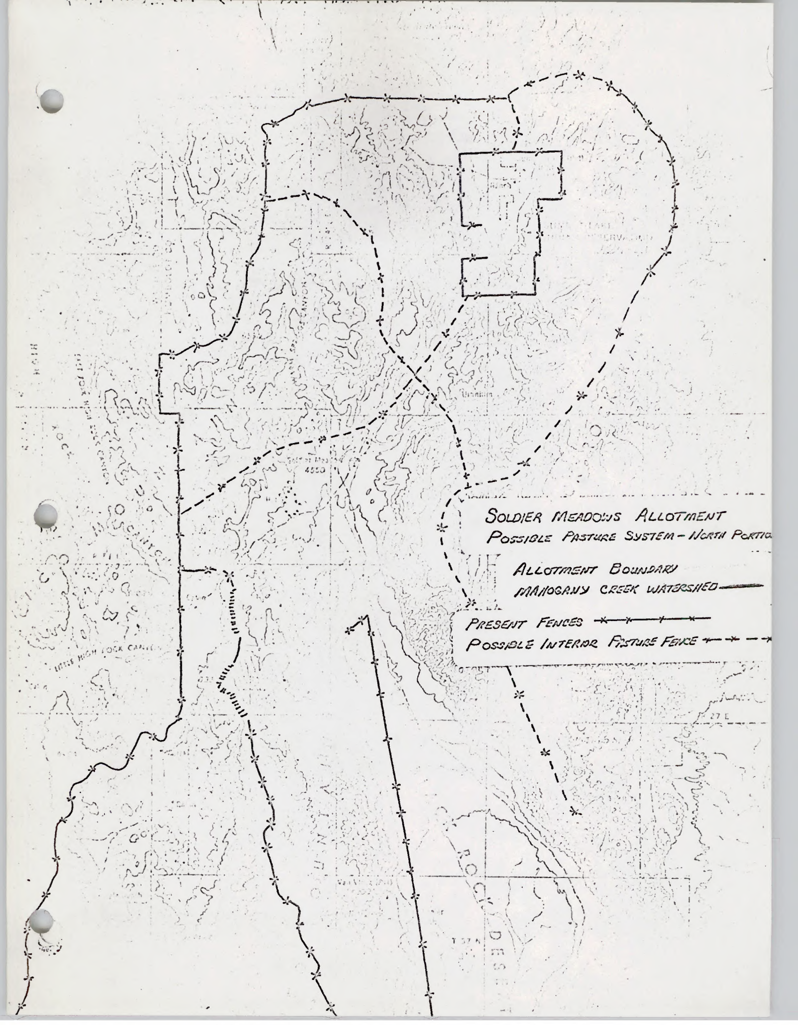
SMALL STREAM FLOW ABOVE THIS POINT

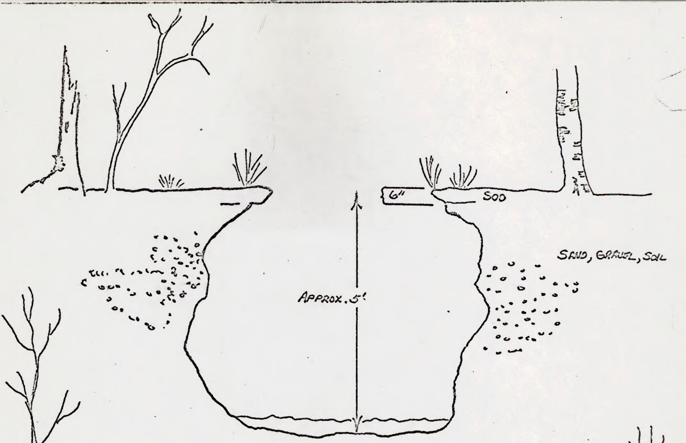
CANYON(WATERFALL

TRASH BARRIERS

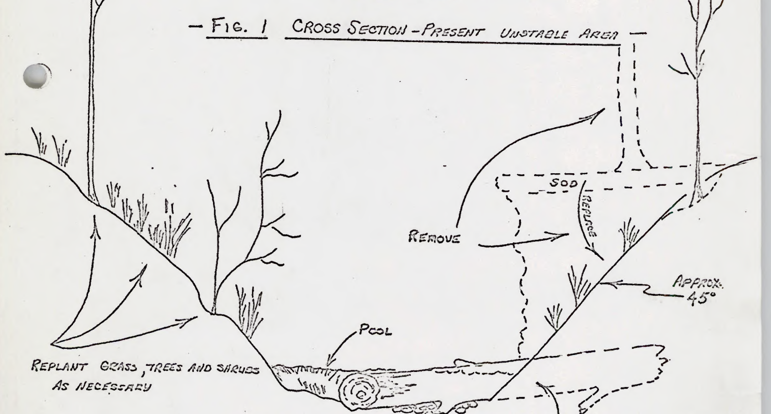
SMALL STREAM FLOW ABOVE THIS POINT

SHEEP WATERING AREA SEVERE TRAMPLING


SOLDIER MEADOWS ALLOTMENT
POSSIBLE PASTURE SYSTEM - NORTH PORTIO



— FIG. 1 CROSS SECTION - PRESENT UNSTABLE AREA —



REPLANT GRASS, TREES AND SHRUBS AS NECESSARY

PLACE LOG IN STREAM — ANCHOR IN BANK
BOULDERS MAY BE EQUALLY SUITABLE TO CREATE A POOL

AREA SHOULD BE FENCED TO PERMANTLY EXCLUDE LIVESTOCK

JCW

— FIG. 2 REHABILITATION OF UNSTABLE AREA —

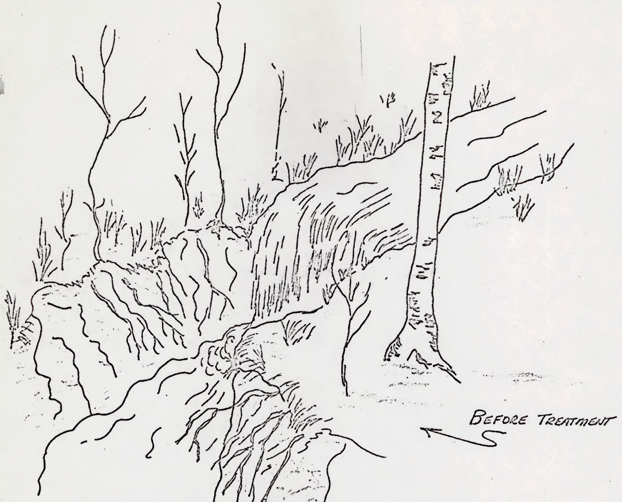


FIG. 3 AS SHOWN IN PHOTO 17